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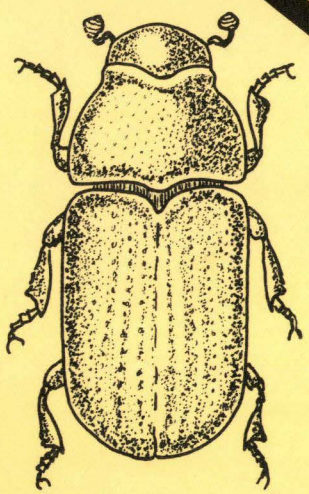

Southwestern Region

U. S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

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ROCKY MOUNTAIN STATION

BIOLOGICAL EVALUATION
Pinyon Needle Scale Infestation

Grand Canyon National Park
Arizona

Branch of Forest Insect and Disease Management
Division of Timber Management
Southwestern Region, USDA, Forest Service
Albuquerque, New Mexico 87101

April 1972

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The pinyon needle scale infestation on the South Rim of Grand Canyon National Park was evaluated by entomologists Robert Frye and Paul Buffam on December 1, 1971. The pinyon needle scale has defoliated trees on the South Rim in the 1960's and early 1970's. The 1971 population was expected to be heavy; however, a period of extreme cold temperatures in January 1971 may have reduced the scale numbers considerably. Light damage is expected at Mather Point and Yavapai Lodge, and light to heavy damage at Desert View Junction in 1972. We recommend that direct control not be undertaken in 1972.

Technical Information

Causal Agent.--Pinyon needle scale, Matsucoccus acalyptus Herbert

Host.--Pinyon pine, Pinus edulis Engelm.

Type of Damage.--Feeding by this pest causes chlorotic needles and premature needle drop. Some trees that have been severely defoliated for several successive years have been weakened considerably.

Extent of Outbreak.--Damage from the pinyon needle scale extends along the South Rim from the eastern boundary of the Park to the major lodge areas.

Biological Information

Sampling Method.--On December 1, 1971, 15 permanent sample trees at Desert View Junction, 15 at Yavapai Lodge, and 10 at Mather Point were examined. Six 2-needle fascicles were collected from each tree and transported to our laboratory where each was examined with the aid of a microscope, and the number of living scales per fascicle counted and recorded. These trees had also been sampled in 1970.

Results.--The data were summarized and the average number of scales per fascicle for each area computed. An average of less than 5 scales per fascicle is considered a light population, and more than 5 is considered a heavy population--one that can weaken the tree. Significantly fewer scales were found on needles at Desert View Junction and Yavapai Lodge in 1971 than in 1970 ($t = 5.19$, $n = 15$; and $t = 3.83$, $n = 15$, respectively) (Table 1). The numbers found at Mather Point in 1970 and 1971 were not statistically significant ($t = 0.78$, $n = 10$). The maximum number of average scales per fascicle dropped greatly at all areas. For example, one tree averaged 79.8 scales in 1970 and only 2.2 scales in 1971.

Discussion and Recommendations

Light defoliation is expected at Mather Point and Yavapai Lodge, and light to heavy damage at Desert View Junction in 1972. Some individual trees will be heavily defoliated at each area; however, the extent of damage should be less in 1972 than it has been in several years. The reason for the sudden decline in the scale population is not clear. However, January 1971 minimum temperatures at Grand Canyon Village reached from -40° to -13° F. for a 4-day period. Little snow was on the ground at the time to insulate the scales from the cold temperatures. This sequence of weather may have had an adverse effect on the scale populations.

Because of the decrease in scale populations and the forecasted light defoliation on most trees at the three areas checked, we recommend that no treatment be initiated in 1972. We recommend

Table 1.--Summary of pinyon needle scale data collected in 1970 and 1971 at the South Rim, Grand Canyon National Park, Arizona.

Area sampled	Total number of trees sampled	Number of scales per fascicle			
		Average		Range	
		1970	1971	1970	1971
Desert View Junction	15	22.6	4.9	7.3-58.0	0.7-13.2
Mather Point	10	5.6	3.1	0.0-29.5	0.0-12.7
Yavapai Lodge	15	19.6	1.2	0.8-79.8	0.0-7.0

that the permanently tagged trees be sampled in the fall of 1972 to gain data for predicting the defoliation expected in 1973.

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